The American Midland Naturalist

PUBLISHED BI-MONTHLY BY THE UNIVERSITY
OF NOTRE DAME, NOTRE DAME, INDIANA.

VOL. III. NOVEMBER, 1914. NO. 12.

NEW SPECIES OF RANUNCULUS.

BY EDWARD L. GREENE.

Ranunculus cymbalistes, nov. spec.

Planta perennis circa 2 dm. alta, carnosula, primo intuitu glabra, at sub lente pilis longiusculis tenuibus subappressis undique conspersa. Radices partim breves, carnosae et subfusiformes, partim multo longiores et tenuiter fibrosae. Folia radicalia longipetiolata, subcordato-reniformia, 1½–2 cm. longa, 2–3 cm. lata, leviter 7-crenata, caulina sessilia, 3-partita. Corolla 1 cm. lata; petala 5, ovalia, obtusa. Fructus nondum visus.

An interesting and strongly characterized member of the *R. abortivus* alliance, known only as collected in extreme southern Indiana, 20 April, 1913, by Mr. Charles C. Deam, where it inhabites wooded knolls, under *Pinus Virginiana* and *Quercus alba;* the special locality two miles west of New Albany. The flowers are not as large as those of *R. Harveyi,* yet much larger than those of the rest of its allies of this group. The foliage remarkably simulates that of *Linaria Cymbalaria.*

Ranunculus delitescens nov. spec.

Vix 2 dm. altus, tenuis, erectus, parce ramosus. Petioli pro parvitate foliorum longi, et una cum caulis parte inferiore, pilis albidis tenuissimis rectis adscendentibus conspicue villosi. Folia parvula, primordialia circa 1½ cm. lata, suborbicularia, basi truncata, apice plus minus distincte crenato-dentata, perpauca sequentia trilobata vel trisecta; caulina sessilia tripartita, segmentis linearibus integris, folia omnia, praecipue basalia, undique pilis longis adpressis plus minsve sparsim obsita. Flores minuti. Carpellorum capitula parvula, subglobosa.

Species of the Atlantic slope, east of the Alleghenies, very distinct in character, yet known to me in only two sheets of specimens, both in U. S. Herb., the best one being from rocky woods at Guttenberg, New Jersey, 12 May, 1895, by William Van Sickle; the other from Harper's Ferry, West Virginia, 11 May, 1889, by F. V. Coville.

Ranunculus Holmii, nov. spec.

Planta 3 dm. alta et ultra; petioli una cum caule pilis longis tenuissimis vel saepissime deflexis vestiti. Folia radicalia plerumque trifoliolata, foliola petiolulata, cuneato-obovata, supra medium trilobata, caulina subsessilia, 3–5-divisa, segmentis perangustis, apicem versus saepissime 3-lobis ceterum integerrimis. Flores minimi, sepalis ovalibus, concavis, extus valde pilosis; filamentis brevibus, liguliformibus. Carpella fere orbicularia, vix subcompressa, in acumen brevem, tenuem et arcte recurvem desinentia, et in capitulum ovale obtusum conferta.

A common plant of low woodland borders and open thickets, in rich alluvial soil along the Potomac River and its tribularies in Maryland and Virginia, where it flowers and fruits in April and early May, its season being entirely in advance of that of *R. abortivus* with which it has been confused, and which occurs in these regions only under widely dissimilar environment.

It has usually been listed as *R. abortivus* var. *micranthus;* but this quite as erroneously; for that plant is of Missouri and Arkansas, according to Nuttall its author; and the comparatively diminutive plant of this affinity which comes into our herbaria from those distant parts, and which answer to Nutall's description, as far as his meager and inadequate account of it goes, has remarkably elongated heads of achenes. They are too long to be called oval, and may be called subcylindric. If this be Nuttall's plant, this character, now first named, is a better one by far than any indicated by Nuttall. As to its fruit, and even as to size, *R. Holmii* is clearly distinct.

Ranunculus ruderalis, nov. spec.

Perennis, radicibus longis, fibrosis, attamen sursum breviter et leviter incrassatis. Caulis 5 cm. altus, validulus, usque ad medium simplex, inde ramosus. Herba tota glaberrima, laete

virens, nullo modo nitens, at quasi leviter glaucescens. Folia radicalia pro planta parvula, longe petiolata, pelerumque rotundato-reniformia, 2–3 cm. lata, crenata; caulina inferiora radicalibus majora, breviter sed distincte petiolata, profunde trisecta, segmentis cuneato-flabelliformibus vel anguste rhomboideis, supra medium plus minus distincte crenatis vel dentatis, suprema sessilia, tripartita, segmentis oblongis integris. Flores minimi. Capitula globosa. Achaenia modice compressa et stylo brevissimo acuto recurvo apiculata.

First observed by me as growing on a railway embankment near Linden Station of the Baltimore and Ohio Railway, within the State of Maryland, but not far outside the District of Columbia, this in May, 1912. Then a few weeks later I saw it growing in great profusion along the line of the same railway quite within the District, namely, on the outskirts of Tacoma Park eastward. It grows there in abdunance in the most exposed places, particularly about piles of brush-wood or other rubbish. In respect to its peculiar habitat, as well as by many diagnostic characters, it is in strong contrast to the less common *R. abortivus*, the leaves of which are thrice as large, besides being readily distinguished always by their deep-green color, with a polished and shining surface; and this, the real *R. abortivus* inhabits only rich soil, entirely in the shade of woods, or if within city limits, in like shaded proximity to walls and buildings.

R. ruderalis is, indeed, next of kin to *R. Allegheniensis*, which it much resembles in the small size and light shade of leaves, without a trace of that lustre characteristic of *R. abortivus* alone; but while the achenes of *R. Allegheniensis* are tipped with a long and conspicuous style, those of *R. ruderalis* end so bluntly as to seem to have no style at all, and a lens is requisite to reveal their presence.

The fact of its having been found by me nowhere but in proximity to a line of railway that runs westward half across the continent should have suggested to me the possibility of its being in this part of the world only as an immigrant from the West; yet the thought did not occur; therefore it was with surprise that I observe it a year later, in the prairie region of the Middle West, and saw that it was clearly native there, where the botanists of that region, never having known the real *R. abortivus*, called it always by that name.

THE ANATOMY OF MEGALODONTA BECKII.

BY A. V. HOECK.

Owing to the abundance of material found during the past vacation at Bankson Lake, Cass Co., Mich., as also because of the unique character of the plant itself as a submerged composite, it was considered possible that the anatomical study of *Megaladonta Beckii* (Torrey) Greene would show some interesting features structurally. The following notes are the result of the investigation of the plant, which is rather abundant in the places where it is found, but has not been reported from many localities in our region.

The plant was first discovered by Dr. Lewis C. Beck in Schuyler's Lake near Schenectady, N. Y. It was published by Torrey who referred it to the genus *Bidens* as *Bidens Beckii* in 1821.[1] Dr. E. L. Greene[2] raised the plant to generic standing as type of his new genus *Megalodonta*. He published at the same time a second species *M. nudata* from the Adirondacks, and another species from Greene Lake, Washington. As characteristic distinctions from the genus *Bidens* is mentioned especially the singular peculiarity not only among the *Bidentideae* as a group but even of the whole composite family, aquatic habit with-submersed and dissected foliage not so much different in appearance from that of *Batrachium* (*Ranunculus*) *aquatile* (Linn.) Wimm[3]. of the old world or our own *Batrachium trichophyllum* Chaix) Bosch.[4] The flowers both ray and disk are peculiar. The rays are "retuse and notched instead of obtuse and entire." "The disk corollas are slender and clavate." "The achenes with their not at all compressed or angled but almost terete body surmounted by several long stout persistent awns of great size and prominence in relation to the essential part the fruit"[5] are the other characters of note. The generic name of the plant is derived from the Greek

[1] Torrey, J. in Spreng. Neue Entdeck., 2, p. 135 (1821) also Torrey, J., Flora of New York, 1, p. 388, pl. 68, (1843), Torrey, J., Compend. p. 312 (1826)) Spreng. Syst. 3, p. 455, (1826), Beck, L. C., Botany, p. 207 (1833) p. 191 (1848).

[2] Greene, E. L., Pittonia, 4, p. 271 (1901).

[3] Wimm. Fl. Schles. p. 8(1841).

[4] Bossch, Prod. Fl. Bat., p. 5 (1850).

[5] Greene, l. c.

μέγας, μέγαλος (megas, megalos) great, large and *ὀδούς, ὀδόντος*, (odous, odontos) tooth.

The plants used for study were found submerged in both Bankson and North Bankson Lakes in bloom during the latter part of August and the early part of September. The submerged leaves are opposite or whorled in 3's, and finely repeatedly dissected on the palmate plan. The emersed leaves two or three pairs in number are narrowly lanceolate to oblong and laciniately toothed, pinnate and reticulately veined. The lower emersed or intermediate leaves are often more or less deeply lobed or cleft appearing as transition forms from the aquatic to the aërial forms. The aquatic foliage invariably withers when by design or accident exposed even for a short time to the air though the emersed may for a rather long time remain undecayed when submerged. The plant grows in rather deep water from several decimeters to several meters, the lower stem or rhizome rooting below the mud level. The submerged floating stem and the aerial part are rather similar in structure and have large air cavities in the cortical region as also in single large central air space in the pith. The rihzome rooting below in the mud is devoid of this central air space and the cortical spaces are smaller and fewer. The adventitious roots at the nodes, even on the floating stem, and the upper roots are conspicuously green with chlorophyll. These roots reach down several decimeters or over a meter and when reaching the muddy bottom branch into numerous smaller divisions. The part of the stem creeping in the mud is not much over half the diameter of the floating aquatic stem, or about 2 mm. and sometimes less. The aquatic foliage is nearly as persistent as that of *Cabomba* but not as deciduous as that of *Neobeckia*. (*Roripa* or *Nasturtium aquatium*). A rather poor drawing of the plant is found in Torrey's Flora of New York already cited and one somewhat better perhaps in Britton and Brown's Flora, both editions pp. 440 and 500 respectively. The characters of the plant may be had in the works cited as also from our common manuals more or less incompletely.

THE ROOT.

The young root has a well marked stele surrounded with well defined endodermis limiting the periblem (Fig. 1). The cell structure of the epiblema seems in no particular way different from that of the

epidermis of the stem. As a rule even in the older roots there is but one series of intercellular spaces more or less oblong and irregular in the cortex and with their ends pointing to the outside and inwards to the stele or anticlinaly while in the stems they are periclinal (Fig. 1a). Only one series of the larger spaces are found in the root and several in the stem, though in the former a few smaller ones are occasionally met with (Fig. 1b). Only one to three layers of cells are found between the larger spaces and the stele inclusive of the endodermis. The cortex of the larger adventitious roots (which were the only ones found for study) has a large number of chlorophyll grains even as far inwards as the endodermis excluded. Nor is chlorophyll found in either the epiblema or the palisaded hypodermal layer of the older roots (Fig. 2). The stele has a wood bundle of the radial type and the xylem is exarch pentarch, the phloem alternating with the xylem rays. Just outside of each phloem strand is a latex tube containing a brownish somewhat resinous substance. The tube is surrounded in this case by four secreting cells in the older roots (Fig. 3) though in young specimens these are not as yet well differentiated or developed These latex tubes are rather straight mostly unbranched tubes with four secretion cells around them (Fig. 3) and are found throughout the plant, and in the stem the secretion cells are more than four, usually about six. (Figs. 5, 8, 9, 13, 17). The pericycle is rather well differentiated as a marked layer of medium sized cells in young parts of the roots, but later it loses to some extent its characteristic appearance the cells of the cortex seeming to pass by gradual variations of size to those of the stele. Very little secondary change takes place in the stele especial in the xylem (hadrome) portion thereof; the ducts always are few in number as would be expected in this case because of the needlessness of these water conducting vessels in aquatic plants. The larger vessels formed later as metaxylem or perhaps secondary xylem are scalariform pitted, those of the protoxylem are annular and later spiral transitional to pitted. Longitudinal section of the root shows the peculiar variations of the tissues in the root in a marked way (Fig. 4). From the exterior we have in order the outer layer of cells (a) and the hypodermal layer (b) these two both devoid of chlorophyll. The cortical cells on both sides of the large intercellular spaces resemble one another, and bear chlorophyll in larger or smaller quantity depending on the exposure

to light. The section shown was made somewhat obliquely through the organ, showing several layers of cells of the tissue connecting the outer layers with the inner near the endodermis (f). In older roots six or seven of the cells in the outer part of the phloem acquire thickened walls though the thickening is never considerable. They seem to approximate to a schlerenchymatous nature, but scarcely typical stereome. Though there is now much difference between the outer layer of the stem and that of the young root, that of the latter with age is strikingly angled and the layer immediately under the epidermis has the appearance of palisaded cells, both layers being devoid of chlorophyll. That this layer may have arisen by subsequent periclinal division is not improbable but was not definitely determined (Fig. 2).

The pith of the root is devoid of intercellular spaces as found in the cortex.

RHIZOME.

While there does not seem to be any considerable difference in structure between the emersed and the submersed part of the stem, there is considerable variation between these and that part of the plant axis which creeps and roots under the mud and may be designated as the rhizome. This is never proportionately as thick and to the naked eye or under a common lens has an internally different structure, being devoid of the central intercellular space, while the cortical spaces are fewer and smaller. (Fig. 6 and 7). The fibrovascular bundles are of the collateral open type and the xylem is strictly pentrach and endarch (Fig. 5 and 6). The cambium forms a rather perfect circle in cross section, developing interiorly somewhat bricklike cells in the interfascicular part (medullary rays), the cells inwards passing gradually into those of the pith. These cells are much in appearance like the cells of the bundle and are thickwalled. The ducts in each bundle are in several series instead of only one as in the rest of the stem. On the outer part of the phloem there are a few layers of schlerenchyma fibres and just outside in the cortex an occasional latex tube. The interfascicular cambium dips inwards but little.

THE STEM PROPER.

The differences between the stem proper and the creeping rhizome have been noted already. The intrastelar fundamental

tissue (medullary rays) are so far extended into the cortical region that the interfascicular cambium is nearer to the epidermis than the outermost portions of the phloem, in spite of the fact that the bundles are open (?) collateral of the typical kind and the xylem endarch pentarch. (Figs. 7 and 8). Several layers within the epidermis there appear at regular intervals perfectly straight vertical latex tubes and near the fibrovascular bundles a few are found at irregular intervals. The xylem is wedge shaped and has outside of it oval strands of phloem, the latter with stereome in several layers on its outer margin. The protoxylem has the usual annular ducts which gradually pass into spiral and finally scalariform pitted, and the ducts in each bundle are all arranged in one line or series increasing in size outwards towards the surface of the plant. The centre of the stem or pith is occupied with a large hollow space.

LEAVES.

As already intimated there are two kinds of leaves present, the submersed and the emersed. The former are short petioled or nearly sessile and repeatedly palmately dissected into linear divisions which in structure are of the centric type. (Fig. 9). The epidermis which is scarcely differentiated except in size and lack of cellwall markings, bears chlorophyll like the rest of the mesophyll layers. Only the layers of cells immediately bordering on the vascular system are devoid of it. The cells of the mesophyll are polygonal in cross section and their sides are marked transversely with scalariform markings. (Fig. 10). The wood bundle is very simple and varies according to the distance the section is made from the petiole. Fig. 9 shows a cross section made of one of the divisions about the middle of the leaf, several ducts are present as also a latex tube as are phloem elements and wood parenchyma. The bundles of the larger and lower divisions are more typically open collateral (Fig. 11). Both xylem and phloem are rather well developed, the former rather more so than were expected in aquatic plants. The epidermis of the submersed leaves is of course totally devoid of stomata and the cells are somewhat longer than broad. (Fig. 12). The petiole of the aquatic leaf is rather more flattened than any of the divisions but it has only a single larger bundle not essentially different from the collateral bundle of the divisions. The phloem strand is rather extensive

in area and number of elements. (Fig. 13). Calcium oxalate crystal aggregates are sometimes found.

EMERSED LEAVES.

The emersed leaves are oblong to lanceoplate sharply or even laciniately toothed, and the intermediate ones between the aquatic more or less cleft or lobed. In structure they are bifacial. A surface view of the epidermis of the upper face is more regular or rather less irregular in cell structure (Fig. 14). The stomata are smaller than those of the lower face and orbicular whereas below they are slightly larger and oval. (Fig. 15). The chlorenchyma viewed from the lower face has many intercellular spaces (Fig. 16). It changes in shape gradually as it passes inwards to the two layers of palisade chlorenchyma. Nearer the midrib the palisade as well as the chlorenchyma pass gradually into rounder chlorophylless cells on both faces. This is augmented by two layers of thick walled cells (Collenchyma) on the lower face and a wedge of similar stereome on the other face. Sectioned about the middle of the leaf there is a large central collateral bundle with several lateral ones in a semicircle (Figs. 17 and 18). In the petiole or at the base of the leaf these are coalesced into one large semicircular collateral bundle. Opposite to the phloem strand and immediately under the stereome on the lower face.

The characteristic features of the plant are the very simple wood bundles undergoing scarcely any secondary changes, as also the simplicity and regularity of all the structures. The roots are in the adult stage of the plant all adventitious and develop chlorophyll regularly as far as the stele. The stomata of both faces of the leaves are somewhat different and the extrastelar cells of the aquatic foliage exclusive of the epidermis have very characteristic scalariform markings. The aquatic foliage is as typically centric in type as the aerial leaves are bifacial.

EXPLANATION OF THE FIGURES.

Fig. 1.—Cross section of the young root of *Megalodonta Beckii*. (*a*) cortical intercellular spaces, (*b*) smaller spaces, (*c*) endodermis, (*d*) pericycle, (*e*) phloem (leptome), (*f*) xylem (hadrome), (*g*) pith, (*h*) latex tube.

Fig. 2. Cross section of the epidermis (ep) and hypodermis (hy) of an older root. (co) cortical chlorenchyma.

Fig. 3. Structure of a latex tube in an older root showing the arrangement of the secreting cells.

Fig. 4. Longitudinal section through the central part of an older root. (*a*) epidermis, (*b*) hypodermis, (*c*) cortical parenchyma with chlorophyll, (*d*) intercellular space, (*e*) extrastelar fundamental tissue the outer cells with chlorophyll, (*f*) endodermis, (*g*) pericycle, (*h*) secretion cells with a latex tube between them, (*i*) phloem, (*l*) wood parenchyma between the protoxylem and inner metaxylem.

Fig. 5. Cross section of a secton of the stele of the rhizome. (*sp*) cortical intercellular space, (*co*) cortex cells, (*la*) latex tube, (*st*) stereome outside of the phloem of the fibrovascular bundle (mestome), (*ca*) Cambium, (*pi*) pith.

Fig. 6. Cross section showing the arrangement of the bundles in the stem of the same. The xylem is endarch pentarch.

Fig. 7. Cross section of the stem (floating, showing the arrangement of the bundles. Figs. 6 and 7 diagramatic and magnified about 18 diameters.)

Fig. 8.—Cross section of the floating equatic stem showing (*e*) epidermis with cortex beneath in which are the latex tubes (*la*) and the large intercellular spaces (*sp*) farther in the stele with the collateral bundles and the outwardly bulging pith (Medullary rays) (*m*), the central pith (*pi*), (xy^1) the protoxylem and (xy^2) the mataxylem.

Fig. 9. Cross section of medium sized division of the aquatic leaf a little above the middle, showing the outer layer of epidermis with chlorophyll and the inner mesophyll also with chlorophyll. In the centre is the single fibrovascular bundle with a few xylem and phloem elements also a latex tube.

Fig. 10. One of the larger mesophyll cells of the above teased out to show markings of the cell wall.

Fig. 11. Single fibrovasular bundle of a larger division near the base of petiole. (*ph*) phloem and (*xy*) xylem. (*wp*) wood parenchyma, and (*me*) mesophyll.

Fig. 12. View of the epidermis of the aquatic leaf divisions.

Fig. 13. Cross section of the bundle of the aquatic leaf petiole with bundle of (*xy*) xylem and (*ph*) phloem, (*gl*) latex tube, (*cr*) crystal aggregate of calcium oxalate.

Fig. 14. Epidermis of the upper face of the aerial leaf with stomata.

Fig. 15. Epidermis of the lower face of the aerial leaf showing stomata.

Fig. 16. View of the pneumatic tissue under the epidermis of the lower face of the emersed leaf.

Fig. 17. Cross section of the middle part of an aerial leaf at the midrib (*ep*) lower epidermis with collenchyma or thick angled cells within it, (*c*), (*co*) fundamental tissue, (*ph*) phloem and (*xy*) xylem of the collateral bundles, (*pl*) modified palisade chlorenchyma.

Fig. 18. Cross section of an emersed leaf showing the arrangement of (*ep*) the lower epidermis, (*chl*) pneumatic chlorenchyma, (*pa*) palisade chlorenchyma, (*st*) stomata.

Scale of all the drawings: one division equals 12.5 microns.

NEW PLANTS FROM NORTH DAKOTA—XII.

BY J. LUNELL.

Dodecatheon thornense sp. nov.

Margines loborum calycis hyalini. Segmenta corollae 12–14 mm. longa, 3 mm. lata, rectangularia vel aliquantulum spatulata, obtusa, pallide usque saturate rosea, linea obscure rosea partem non divisam proxima. Haec pars lineam albam angustam exteriorem habet, deinde cum annulo purpureo fluctuoso inter basim segmentorum et tubum stamineum interjecto flava fit. Filamenta conjuncta 2 mm. longa. Antherae tubo filamentorum duplo longiores, tergo saturate rubrae usque atropurpureae, lateribus albidae.

Calyx lobes hyaline margined. Segments of the corolla 12-14 mm. long, 3 mm. wide, rectangular or somewhat spatulate, obtuse, varying from a pale to a deep rich rose color, with a dark rose line nearest to the undivided part; this has a white, narrow outer line, then becomes yellow, with a narrow, scalloped ring of deep purple midways between the base of the segments and the filament tube. United filaments 2 mm. long. Anthers twice as long as the tube of filaments, deep red to black-purple on the back, with whitish sides. For the description of the other parts of the plant read page 146, vol. III of this journal (October 1913).

This plant was collected in flower on June 10, 1914, by the writer at Thorne, N. Dakota. The leaves were considerably infected by a fungus, *Nigredo Polemonii* (Peck) Arth. I.

The characters segregating it from its ally, *D. pauciflorum* (Durand) Greene, are: segments of the corolla are of a pale to deep rich, rose color, in drying changed to lilac; flowers 10–16, united filaments are 2 mm. long; anthers are twice as long as the stamen tube; and the leaves differ (l. c. p. 146). *D. pauciflorum* seems to have lilac colored corolla segments also in the fresh plant, has the united filaments at least 3 mm. long, the anthers less than twice as long as the stamen tube, the flowers are few, and the leaves differ (l. c. p. 146).

This description has been added because only the fruiting plant was the available material for study in writing the paper of October 1913.

Laciniaria scariosa uniflora var. nov.

Apex caulis calathium solitarium gerens. Planta 1–2 dm. alta.

Stem 1–2 dm. high, with one single calathium. Leaves often arranged as in var. *supereminens*, or var. *basilaris* (vide Vol. II. p. 92 of this journal).

Collected by the writer on August 25, 1914, at Leeds, Benson County, where it is met occasionally on level plains.

Aster Kumleinii oliganthemos var. nov.

Planta decimetralis, plerumque uniflora, parva.

Plant 1 dm. high, usually carrying only one flower, this small, like the whole plant, which is one or few stemmed, few-branched or simple.

Collected by the writer on high hills bordering James River, at Jamestown, Stutsman County, August 24, 1913.

Erigeron tardus sp. nov.

Caules solitarii usque plures, 3–4.5 dm. alti, 3-usque 6-capitati, pubescentia brevi appressa vestiti, usque inflorescentiam stricti, dein aeque atque S curvati. Folia demum glabrata, denticulata, caulina superiora linearia, inferiora anguste lanceolata, radicalia late lanceolata, in petiolos longos alatos sensim reducta, 10–15 cm. longa. Capitula 3–4 cm. diametro (radiis albis latis inclusis).

Stems 1 or more, 3-4.5 dm. high, with 3 to 6 heads, having a short appressed pubescence, straight up to the inflorescence then bent like an S. Leaves at length glabrate, denticulate, on the upper part of the stem linear, on the lower part of the stem narrowly lanceolate; basal leaves broadly lanceolate, gradually narrowed into long, winged petioles, 10-15 cm. long. Heads 3-4 cm. in diameter (including the broad, white rays).

Distinguished from *E. procerus* and *E. anodontus* by its broad, acuminate, glabrate leaves and its appearance during the latest part of July, which is a long time since these allies have passed flowering.

Collected by the writer on a sunny roadside in York Township of Benson County, northwest of Leeds, July 26, 1913.

This group of daisies seems to be, under favorable conditions,

capable of a prodigious development. I have of *E. procerus* one plant, bearing nine stems and thirty flowering heads!

Chenopodium virgatum sp. nov.

Caulis 9–11 dm. altus, erectus, virgatus, ramis brevibus, gracilibus, fastigiatis 4–20 cm. longis, de basi sursum florentibus vestitus, pulverulentus, striato-angulatus. Folia flavido-viridia, rhombico-ovata, tenuiora sed firma, dentibus mediocribus variabilibus angulato-dentata, hastata, superne glabrata, subtus pulverulenta, gracilius petiolata, prope basim distincte 3-nervata. Flores in racemos vel spicas longas densasque, in paniculum amplum confertum collocatos dispositi. Perianthus pulverulentus flavido-fuscus (maturus saltem), lobis dorsi leviter cristatis, scarioso-marginatis, diffusis, dimidium tantum utriculum operientibus. Pericarpus opacus, leviter pulverulentus. Semen atrum, nitens, 1.25–1.5 mm. diametro, pericarpo firmissime adherens.

Stem 9–11 dm. high, erect, virgate, with short, slender, fastigiate branches, flowering from the base upwards, 4–20 cm. long; pulverulent, striate-angled. Leaves yellowish-green, rhombic-ovate, rather thin but firm, angulate-toothed, with the teeth of variable size, hastate or nearly so, glabrate above, pulverulent beneath, on slender petioles, distinctly 3-nerved at the base. Flowers in long and dense cluster or spikes, arranged in a large and close panicle. Perianth pulverulent, yellowish-brown (at least when mature), its lobes lightly crested, scarious margined, spreading, long enough to cover only the half of the utricle. Pericarp dusky, pulverulent. Seed black, shining, 1.25–1.5 mm. in diameter, very firmly adherent to the pericarp.

Collected by the writer on August 23, 1913 at Bismarck, Burleigh County, on the banks of the Missouri.

Chenopodium virgatum var. **junceum** var nov.

Graciliores etiam rami; flores in spicis angustioribus, nonnihil interruptis; folia integra, lanceato-linearia.

Still more slender-branched, with narrower, somewhat interrupted flower-clusters; leaves entire, lance-linear.

Collected by the writer on the same date and place as the type, though they were not intermingled.

Leeds, North Dakota.

NOTES ON OUR LOCAL PLANTS.—IX.

BY J. A. NIEUWLAND.

Family 70. **PODOPHYLLEAE** DC., Syst. II, p. 31, 32, (1821).

Podophylaceae Bartling, Ord. p. 251, (1831).

Subfamily Podophyllieae.

ANAPODOPHYLLUM Tour., Els. p. 204, (1694), I. R. H. p. 259 (1700) also Moench Meth., p 227 (1794). *Podophyllum* Linn. Syst. (1735) Gen. p. 151 (1737) p. 223 (1755).

Anapodophyllum peltatum (Linn.) Moench, l. c.

Podophyllum peltatum Linn. Sp. Pl. p. 505 (1758).

Lake Maxinkuckee (H. W. Clarke) No. 1942 Notre Dame. Common and abundant throughout the whole region.

Subfamily Caulophyllieae.

CAULOPHYLLUM L. C. Richard in Michx. Fl. Bor. Am. I 204 (1803).

Caulophyllum thalictroides (Linn.) L. C. Rich., l. c.

Leontice thalictroides Linn. Sp. Pl., p. 312 (1753).

No. 2703 Rum Village, South of South Bend, Ind., Laporte Co. (Deam). Rather common and quite abundant in moist woods throughout the region. Found in Cass, Berrien, Lake, Laporte, Marshall, Elkhart and Van Buren Cos.

Family 71. **BERBERIDEAE** Vent., Tab., III, p. 83 (1799).

Berberidaceae T. and G. N. Am. Fl., p. 49 (1839).

BERBERIS Cuba, Hort. Sanit. (15th Cent.), also Jacob de Manliis in Brunfels Herb. Viv. Ic. p. 174 (1531), Tour., Els. p 487 (1694), p. 614 1700). *Ambiberberis* Galen (?) *Amirbaris*, Avicenna (?) *Oxyacanthos* Dioscorides (?) *Crespinus* Matthioli, Ruellius, Tragus, Fuchs. *Berberis* Dodonaeus (1557) Turner, Gesner, Lacuna, Lonicer, Lobelius, Castor Durante, Cusa, Rauwollf, Camerarius, etc. *Oxyacantha* Ruellius but not Diosc. tests C. Bauhin Pinax, p. 454 (1623).

Berberis vulgaris Bellonius, Cult., (1553). also Clusius, *Berberis dumeterum* Tour., Els. l. c. *Berberis officinarum* Ruellius Diosc., p. 77 (1547). *Berberis vulgaris* Linn. Sp. Pl., p. 330 (1753).

The cultivated variety with purplish leaves was found to

have escaped in the Rum Village woods a considerable distance from any habitation. It was probably disseminated from seed. It was also found along the Pere Marquette R. R. south of St. Joseph, Mich. In the latter case it probably came from an adjoining park or grave yard.

No. 2134 Notre Dame also 7509, 906.

Berberis canadensis Miller Gard. Dict., Ed. 8.

A specimen was found about 20 years ago near the bank of the St. Joseph River at the Four Mile Bridge. The plant has since disappeared.

Berberis Thunbergii DC., Syst., II, p. 9 (1821).

The plant shows a tendency to escape from cultivation at Notre Dame and sows itself and spreads in moist and shady locations. It is at least as presistent an escape as *Philadelphus coronarius*.

Family 72. **MENISPERMACEAE** DC. Prod., I, p. 85 (1824).

MENISPERMUM Tour., Acad. Reg., 237 (1705), also Dill., Gen., p. 150 (1719). Linn., Gen. p. 107 (1737), p. 158 (1754), Syst. (1735).

Menispermum canadens Linn., Sp. Pl., p. 34 (1753).

No. 2172 St. Mary's, Notre Dame, Ind., also 2167½. Found throughout the region.

Family 73. **LAURINEAE** Vent., Tabl. II, 247 (1799).

Lauraceae Lindley Nat. Syst., Ed. 2, p. 335.

SASSAFRAS Monardes (1580), also Castor Durante (1685) C. and J. Bauhin, Gerard, Ray, Muntigius, Plunkenett, Caesalpinus De Plantis, p. 418 (1583), *Sassafras* Trew, Herb. Blackw., 267, (1757). *Euosmus* Nuttall, Gen., p. 258 (1808).

Sassafras variifolium (Salisb.) Kuntze Rev. Gen. Pl., p. 574 (1891).

Laurus variifolia Salis. Prod., p. 394 (1796). *Sassafras officinale* Nees and Eberm., Hand. Med. Pharm. Bot., II, p. 418 (1831). *Laurus Sassafras* Linn., Sp. Pl., p. 371 (1753).

Sassafras albida var. **glauca** Nov. var.

Sassafras albida Nuttall, l. c. segregate.

Planta *Sassafras albidae* Nuttallii similis sed arbor magna cum foliis inferiore facie pervenosis et cum arbor maturus sit integris obtusis ovatis.

This plant is indeed so very different from the typical pubescent Red Sassafras that it seems a wonder to us that Nuttall's plant has not been recognized. The twigs at first but slightly pubescent become bluish white glaucous later without the slightest trace of pubescence. The real *Sassafras variifolium* is a plant whose twigs are permanently tawny or brown tomentulose. The leaves in older specimens are broad and two lobed. I have found our western white Sassafras as a large tree and typically without any lobed leaves when it has attained maturity. I have watched several trees for a number of years and have never seen a single lobed leaf on these, though in widely separated localities. Usually there are a few lobed leaves and these are the more numerous the younger the specimens. Our western plants are somewhat more treelike than those described by Nuttall and the leaves are thicker and more veiny, the twigs more angled and glaucous On these few characters it is perhaps sufficient to characterize a new variety as distinct from *S. albida.* Type No. 18000 from Rum Village south of South Bend, Ind. in the University Herbarium.

In studying the plants of the east in the field as also from specimens in our herbarium it would seem that there are several widely different varieties at least along the Atlantic Seaboard. I have not found typical *Sassafras variifolium* in our region.

Reported as *Sassafras variifolium* (?) from the counties are: Millers, Lake Co. (Deam) Pine, Ind. Higdon and Raddin, Lake Maxinkuckee (H. W. Clarke) Laporte Co. (Deam) also Starke Co. (?) Specimens of the variety in our herbarium are No. 971, 2222, Notre Dame, Chain Lake, St. Joseph Co. No. 9442, Mineral Springs, Porter Co. Nos. 11057, 10272. No. 2004 Notre Dame, (Powers).

BENZOIN Boerhaave, Index Alter Plantar., II, p. 259 (1727), also Ludwig Def. Gen. Pl., (1737), Fabricius, Enum. Pl. Hort. Helmst., (1763), *Lindera* Thunberg Diss. III, p. (1783) not *Lindera* Adanson, (1763).

Benzoin aestivale (Linn.) Nees, Syst. Laur. p. 495 (1836).

Laurus Benzoin Linn., Sp. Pl., p. 370 (1753) *Lindera Benzoin* Blume, Mus. Bot. Lugd., I, p. 324 (1857).

Porter, Starke Co. (Deam) Millers and Casella (Higdon and Raddin) Lake Maxinkuckee (H. W. Clarke), Nos. 11458 Rum Village, South Bend, Ind. 9368 Notre Dame, Ind.

ORDER 26. RHOEDALES.

Bartling, Ord. Nat. Pl., p. 254 (1831) *Papaverales* Britton, Man. p. 437 (1901).

Family 74. **PAPAVERACEAE** B. Jussieu, Hort. Trian. A. Jussieu, Gen' (1789).

PAPAVER Vergil, Georg. I, 212, IV, 131. 545, Aen, I, 78. Also Columella X, 314, Pliny, XX, 76, *Mekon* of the Greeks, Homer, 306, Nicander, Dioscorides, Theophrastus, Theocritus *Papaver* of all the pre-Linnaean authors without exception, *Papaver* Tour., Els. p. 203 (1694), I. R. H., 234, Linn., Syst. (1735), Gen. p. 150, (1737), p. 224 (1755).

Papavex cereale Vergil, Columella l. c.

Papaver erraticum Pliny, l. c. also Matthioli, Cordus, Gesner, Lenicer, Dodonaeus, Thalius, Castor Durante, Tabernaementanus, Fuchs, etc. *Papaver Rhoeas* Lobelius, Gerard, Dodonaeus (1557) Linnaeus Sp. Pl., p. 507 (1753) *Papaver erraticum* or *rubeum* Brunfels Herb. Viv. Ic., II, 28 (1532) *Mekon Rhoias* Theophrastus IX, 13.

The plant is found escaped from gardens though not found as commonly as a weed in fields as in Europe. Found in Berrien and St. Joseph Cos.

Papaver soporiferum Vergil, Aen., IV, 131.

Papaver sativum Pliny, XX, 13, Columella, XI, 3, *Papaver nigrum* Brunfels, *Papaver somniferum* Linn., Sp. Pl., p. 508 (1753), *Papaver album* Pliny, Tragus Dodonaeus. *Papaver candidum* Lobelius, Caesalpinus, *Papaver soporiferum* Matthioli, Dodonaeus, Tabernaemontanus.

The plant is not as commonly escaped as the preceding but I have found it in St. Joseph Co.

STYLOPHORUM Nuttall Gen., II, p. 7 (1818).

Stylophorum diphyllum (Michx.) Nutt. l. c.

Chelidonium diphyllum Michx. Fl. Bor. Am., I, 309 (1803), *Meconopsis diphylla* DC. Syst., II, p. 88 (1821).

Berry Lake, Pine Station, Millers (Higdon and Raddin). Nos. 500, 532, Rum Village, South Bend, Ind.

ECHTRUS Loureiro, Fl. Cochin Ch., p. 344 (1790).

Argemone Tour., Els. p. 204 (1694) I. R. H., p. 532 (1700). Also Linn., Syst. (1735) Gen. p. 150 (1737) p. 225 (1755) Hort.

Cliff., p. 209 (1737) not *Argemone* Tragus Lacuna, Lonicer, or of the older writers = species of *Papaver*.

Echtrus mexicanus (Teux).

Argemone mexicana Tour. l. c. Linn. Sp. Pl., p. 508 (1753), *Echtrus trivialis* Tour., l. c.

No. 11183 Webster's Station North of Notre Dame, in a field of clover.

BELHARNOSIA Sarracen ex Adanson Fam. p. 43 (1763).

Sanguinaria Dillenius Hort., Eltham., p. 252 (1732) Linn., Syst. (1735) Gen. p. 150 (1737), p. 223 (1755), not *Sanguinaria* Pliny and the pre-Linnaean writers, nor Tragus, etc. = *Panicum sanguinale* Linn. or some grass.

Belharnosia canadensis (Linn.).

Sanguinaria canadensis Linn., Sp. Pl. p. 505 (1753).

St. Joseph Co. (Rothert), Laporte Co. (Deam), Lake Maxinkuckee (H. W. Clarke), Nos. 2005, 9424, 2008, Notre Dame, Ind. 7705 3 miles north of Notre Dame, 11176 Rum Village south of South Bend, Ind., 1435 Notre Dame (W. W. Johnson), Nos. 826 North Liberty, St. Joseph Co., 654 Notre Dame have the leaves and general characters of *B. (S.) mesochora* (Greene).

CHELIDONIUM Theophrastus tHist., VII, 14.

Theocritus Idyl. XIII, 40, Nicander Ther. 857. Dioscorides Mat. Med., II, 211. Pliny XXV, 50, also nearly all of the older writers. *Chelidonium* Tour. Els. p. 197 (1694). *Hirundinaria* Theodore Gaza, (1529) also Lobelius.

Chelidonium majus Ruellius, Diosc. p. 207 (1547), also Gerard (1596 and of most of the pre-Linnaeans! *Chelidonium vulgare* Clusius, *Hirundinaria major* Lobelius. *Chelidonium majus* Anguillara, Matthioli, Fuchs, Turner, Lacuna, Cordus, Gesner, Castor Durante, Caesalpinus, Lobelius, Thalius, Tabernaemontanus, Gerard, Dodonaeus, etc. also Linn., Sp. Pl. p. 505 (1753).

Found at St. Joseph, Mich. along the Pere Marquette R. R. No. 11030 along the St. Joseph River at Notre Dame on the high sandy bank in several places some distance apart.

Family 75. **FUMARIACEAE** DC. Syst., II, p. 105 (1821).

Subfamily Fumarieae.

CAPNORCHIS Boerhaave Index Alter Planter. I, p.309 (1727) *Bicuculla* Adanson, Fam. II. App. p. 23 (1163), *Dielytra* Borckh. Roem., Arch. I, p. 46 (1797), *Dicentra* Bernh. Linnaea VIII, 468 (1833), *Cucullaria* Jussieu Act. Par. (1743).

Capnorchis canadensis (Goldie).

Corydalis canadensis Goldie Edinb. Phil. Jr. VI, 329 (1822) *Dielytra canadensis* DC. & Prod. I, p. 126 (1824), *Dicentra canadensis* Walp., Rep., I, p. 128 (1842), *Bicuculla canadensis* Millspaugh, Bull. W. Va. Agric. Exp. Sta., II, p. 327 (1892).

No. 7708 Notre Dame, Ind., (W. W. Johnson), 7702 Rum Village, South Bend, Ind. 9217½, Twin Springs, Mich. (Berrien Co.).

Capnorchis Cucullaria (Linn.)

Diclytra Cucullaria DC. Syst. Veg. II, 608 (1821), *Diclytra Cucullaria* Torrey Fl. N. Aim. I, p. 66 (1838), *Dicentra Cucullaria* Torrey, Fl. N. Y., I, p. 451 (1843), *Bicuculla Cucullaria* Mills. l. c.

Lake Maxinkuckee (H. W. Clarke) Nos. 451, 2486, Rum Village, South Bend. 7700 2 miles north of Notre Dame.

Nos. 7702 and 7700 contain two specimens that look superficially somewhat like *C. canadensis* but a closer examination of them reveals the following. The spurs though short are not turned inwards to the pedical but divaricate and blunt. The sepals are short and of the same shape as those of *C. Cucullaria* though but about one-fourth as large whereas the shape of these of typical *C. canadensis* are lanceolate. The underground parts are like those of the former. The plant seems intermediate between the two typical plants and might possibly be a hybrid as those sometimes bloom at about the same time in our region, belated flowers of *C. Cucullaria* being almost coetaneous.

Subfamily, Corydalieae.

CORYDALIS Castor Durante (1585).

Capnoides Tour., Els., p. 335 (1695), I. R. H., p. 423 (1700) *Neckeria* Scepoli Introd. p. 313 (1777), *Corydalis* Vent., also Medicus Phil. Bot., p. 96 (1789), *Pseudo-fumaria* Rivinus. (1666) *Capnoides* Adans., Fam. Pl. p. 431 (1763).

Corydalis sempervirens Pers. Syn. II, p. 269 (1807).

Capnoides sempervirens Borek., Roem., Arch., I. p. 44 (1797). pt. I. *Corydalis glauca* Parsh Fl. Sept., p. 463 (1814) *Fumaria sempervirens* Linn., Sp. Pl. p. 700 (1753).

Lake Co. (Hill), Porter Co. (Cowles).

Corydalis flavula Raf., DC., Prod. I. p. 120 (1824).

Capnoides flavulum Kuntze Rev. Gen., p. 14 (1891).

Nos. 1916, 1838, 9222 Rum Village, south of South Bend, Ind.

(To be continued.)

A NEW ANTENNARIA.

BY B. F. BUSH.

Antennaria ampla n. sp. Folia caulium sterilium 4–5 cm. lata, 5-10 cm. longa, (petiolos tenues includentia), primo villoso-tomentosa facie superiore cito glabra, inferiore quidem dense flaveo-tomentosa. Planta fertilis caulibus 3-4 dm. altis, tenuibus, laxe tomentosis cum foliis 8-12 oblongis, acutis, 1-3 cm. longis. Capitula pauca, minuscula, subsessilia in summitate pedunculi insita. Bracteae involucri permultae in 2-3 seriebus; interiores vero longiores, angustiores et acutae, exteriores quidem apice denticulato, et ambae ad apicem scariosae. Planta staminea caulibus .5-1.5 dm. alta laxe tomentosa, cum 5-8 foliis anguste oblongis acutis. Capitula pauca in summitate pedunculi capitata; bracteis paucis in 2-3 seriebus, exterioribus oblongis, et brevioribus quam in interioribus, quae late oblongae aliquamtulum dilatatae, majores, et ad apicem denticulatae singulariterque scariosae sunt. Pappus ad apicem aliquantulum dilatatus et serratus.

Antennaria ampla n. sp. Leaves of the sterile shoots ample, 4-5 cm. broad, 5-10 cm. long, including the slender petioles, at first villous-tomentose above, soon glabrous, below densely yellowish-tomentose. Fertile plants with stems 3-4 dm. tall, slender, loosely tomentose, with 8-12 oblong, pointed leaves, 1-3 cm. long; heads several, rather small, subsessile at the top of the stems; involucral scales numerous, in 2 or 3 series, the inner longer, narrower, and acute, the outer broader, shorter, and denticulate at apex, all showily scarious at tips; male plants with stems ½-1½ dm. tall, loosely tomentose, with 5-8 narrowly-oblong pointed leaves; heads several, in a capitate cluster at top of stems; involucral scales few, in 2 or 3 series, the outer oblong, shorter than the inner, the inner broadly oblong, somewhat dilated, larger than the outer, denticulate at apex, the upper portion showily scarious; pappus-tips slightly dilated, serrate. This species was discovered by myself, in company with Misses Martha and Pearl Julian, and my two daughters, May and Hazel, on May 22, 1914, No. 7119.

The precise locality where this species was found is about 2 miles east of Atherton, Missouri, and near the old postoffice of Blue Mills, now called Twyman, in honor of Dr. Twyman's

family, who have long resided there. The special habitat of the species, the wooded crowns of several high hills along the Missouri River at this place. The fertile and sterile plants were growing together, the males by the hundred, the fertile plants rather scarce, therein differing from all the other broad-leaved species of this region, the sterile plants of which have never been seen.

This plant is distinct from all the broad-leaved species known to me to occur in this region, as shown by the following key:

Scales of the fertile involucre broad, with broad showy tips.
Pappus-tips in male narrow, serrate....*A. occidentalis.*
Pappus-tips in male wide, crenate.....*A. calophylla.*
Scales of the outer involucre narrow
Scales not showily scarious-tipped.
Scales few, subequal; pappus-tips in male subserrate .....*A. umbellata.*
Scales many, well-imbricated; pappus-tips in male crenate.....*A. mesochora.*
Scales showily scarious-tipped, numerous, unequal, in several series; pappus-tips in male narrow, serrate.....*A. ampla...*

NOTES ON HEMEROCALLIS.

BY N. M. GRIER.

The writer while comparing specimens of *Hemerocallis fulva* and *flava* during the past summer, was led to note peculiarities of these two species, which do not seem to be generally known to botanists. It will be convenient to introduce excerpts from our common manuals.

Gray's Manual.[1] Hemerocallis L. Day Lily.

". . . . Capsule at first rather fleshy, 3-angled, loculicidally 3-valved, with several black spherical seeds in each cell. . . ."

H. fulva—(Common D.). . . . Roadsides, escaped from gardens. Introduced from Europe.

Britton and Brown.[2]

". . . . Ovary oblong, 3-celled, ovules numerous in each cavity. . . ."

[1] Gray's New Manual, 7th edition.

[2] Britton and Brown "Illustrated Flora of U. S. and Canada."

1. *H. fulva*—. . . . Found New Brunswick to Virginia to Tennessee. In meadows and by streams. Europe and Asia. Escaped from cultivation.

2. *H. flava*—yellow day lily, with yellow flowers, occasionally found near old gardens, and on roadsides.

It will be noted from the above, that in Gray but one species of *Hemerocallis* is given—the more common one. Britton and Brown, however, add to this *flava* as well as other plants closely allied. Since it seems that neither *fulva* nor *flava* were the original type species of this genus, the writer has noted that at least within the geographical range to be mentioned, capsules, which one might infer to present, are wanting in *H. fulva*. Referring to Knuth,[1] this is found to be the normal condition in Europe. A paragraph from this work may be of interest.

"According to Sprengel's assertion, which Kerner confirms, the plant, (*Hemerocallis fulva*), never sets fruit here, so it is highly probable that in its original home in east Asia, it is pollinated by such insects as are not to be found in Europe. Maximowicz states that artificial pollination is also ineffective, the flowers do not produce mature seeds in Europe. Sprengel, who pollinated the flowers artificially with their own pollen, also obtained no fruits, etc." There then follows a description of the mechanism producing this condition. Mr. W. G. Gibson of Avalon, Pa., who is an experienced horticulturist, and who has observed this species well within the limits as described by Britton and Brown, reports that he has never seen the plant in fruiting condition. It is not improbable therefore that such a condition as above described prevails in the American form also. Granted that this is the case, descriptions of *H. fulva* as ordinarily given tend to be somewhat misleading in the respect discussed—an error which will be found to be present in many of the popular "Wild Flowers" books. *H. flava*, less known in this country and also self-sterile, is thus more typical of the genus. It is noted that in some 63 specimens of *H. flava* examined, the greatest number of seeds in any valve was 7, some of the valves being devoid of these, or containing a minimum number.

The writer is able to add *H. flava* to the flora of Pennsylvania Porter[2] not recording it. *H. fulva*, as an escape is distributed over

[1] "Knuth's Handbook of Flower Pollination." Trans. J. R. A. Davis, Vol. III., p. 462.

[2] "Flora of Pennsylvania."—Porter, C. H.

the greater part of the upper Ohio Valley, growing principally upon earlier glacial deposits. *H. flava*, although as yet seen only in cultivation by the writer, may then be expected to be found at any time as an escape in the locality given. Dr. O. E. Jennings relates of collecting this species in Ohio, although it is not listed by Schaffner.[1]

Central High School, St. Louis, Mo.

COMPARATIVE MIGRATION OF OUR BIRDS IN AUTUMN.

BY BROTHER ALPHONSUS, C. S. C.

Between the earliest and latest date of the Cowbird there were 58 days, which would indicate that either the writer missed the date in one year by a very wide mark or that the Cowbird can be very irregular in its time of migrating. The date for 1911 was 23 days earlier than in 1912 and 28 days earlier than in 1913. The two regular dates were in October, which is likely the usual time of migrating.

In 1909 the Red-winged Blackbird was observed last on August 26 and in 1911 no record was made for autumn. These facts show that the species is exceedingly rare at this season of the year, and will be found only by a fortunate observer. The two dates in November for 1912 and 1913, which are two weeks apart, gives us the probable time of departure as well as the difference of one year from another.

The Hermit Thrush was very regular in its arrival from the

[1] "Catalogue of Ohio Vascular Plants." Schaffner, J. H. Ohio State University Bulletin, Vol. 28, No. 224.

Linnaeus. (Species Plantarum, 1753, p. 324). admitted the now recognized species *H. flava*, (*flavus*), and *H. fulva*, (*fulvus*), as varieties of *H. Lilio Asphodelus* both forming a composite type species for the genus. Dr. J. A. Nieuwland has pointed out, (AMERICAN MIDLAND NATURALIST, Vol. II., p. 106), and also in a recent letter to the writer, that an interpretation of Linnaeus consistent with the rules of Rochester and Vienna, makes the form recognized as *H. flava* the type of the genus, as it was by examination of Pre-Linnaean authors. It is evident from the above therefore, that the valid name according to the nomenclature of *H. flava*, is really *H. Lilio Asphodelus*.

north for three years, but in 1912 it was not seen until Oct. 13, which was the only record for the species that autumn. (When two dates are given for any species, that means the first was the date of arrival from the north). It will be noted that the Hermit Thrush was regular for two years in the time of its departure, but 8 and 9 days earlier and 9 and 10 days later than the regular dates in the other two years—18 days being the difference between the earliest and the latest date of departure.

The Kingbird was regular in its time of leaving except in 1912, when it departed on August 22. This date was 15 days earlier than the latest date, which was on Sept. 6. Barring the one early date, this species left regularly in the first week of September.

The Hummingbird is seldom recorded by the writer at any season of the year, and this fact will probably explain the marked difference in the dates of migration for the species. Only two dates—in September—can be called regular, the third—in August—being 23 days earlier than the latest date. The August date must have been far from the true time of departure, yet it was obtained from a fairly diligent search.

Considerable disparity is shown in one of the dates of the Vesper Sparrow—Sept. 30, 1912. This date was 26 days later than the earliest date. No record was made in 1913, which, with the single late date in 1912, would indicate that it is difficult to determine the time of departure for this species. The regular dates are too early for this sparrow, which—being such an early spring migrant—must tarry with us as late as October.

In the Baltimore Oriole we have a species that shows the greatest regularity of any of our birds in the time of its autumn migration. Only 2 days between the earliest and the latest date, is the remarkable record for this species.

The Barn Swallow shows 18 days between to be the difference between its earliest and latest date of migration. The time between the third date—August 31—and the latest date—Sept. 6—the writer thinks indicates the true time of migration.

Only two dates were made for the Loggerhead Shrike—one in August and one in September—with the difference 24 days. This species is difficult to record, especially after the nesting season; and the single record for September is hardly sufficient to determine with satisfaction when the species migrates.

The four records of the Purple Martin are divided between August and September—the dates of each set being regular. There are 16 days between the earliest and latest dates, and 12 days separating the other records. From these figures we can see that this species may leave on dates that are 1 or 2 days apart or within a period that is a little less or a little more than a fortnight.

The three dates of the Yellow Palm Wrabler place this species among the migrants that are regular in their time of leaving, two days being the greatest difference. But the same regularity is not observable in the two dates of arrival—12 days separating them.

The Bronzed Grackle presents a case of great disparity in its dates of migration, no fewer than 54 days intervening between the earliest and the latest dates. But such an early record as September 15 may be set aside in determining the true time of migration for this species; and the interval between Oct. 20 and Nov. 8—18 days—may be taken as the probable period in which this grackle usually departs.

The Warbling Vireo showed regularity in all of its dates except one, which was 10 days later than the earliest date. The Redstart was more regular still—two of the dates being identical and the others, 3 and 8 days later respectively. The Golden-crowned Kinglet must also be ranked among the regular arrivals in autumn—5 days making the longest interval; but there is less regularity in the time of departure.

A very curious case both of irregularity in migrating and of non-migration was that of the Red-headed Woodpecker. Between the earliest and the latest date there were 23 days; between the earliest and a later date there were 8 days. In 1913 the species did not migrate; but remained throughout both autumn and winter. A very interesting occurrence indeed was this non-migration of a species that left for three previous years in the month of September. What is the explanation? The winter proved a very mild one; and could the bird have known so long beforehand that the season would not be severe? I think the bird must have been able to determine this, but how I can not say.

Two species that showed marked regularity in three of their dates, but great disparity in one date, were the Myrtle Warbler and the Snowbird. The early arrival of the Snowbird on Sept. 4,

1913—was 13 days ahead of the earliest date of the other three years; while the Myrtle Warbler was 26 days earlier in 1911 than any other of its dates. Perhaps the early date of the Snowbird may be accounted for as the result of greater diligence on the part of the writer; but such an explanation would not be correct for the Myrtle Warbler. In 1911 this species was frequently seen after Sept. 11, which is 14 days earlier than the earliest date of any other year; and the characteristic call-note of the species always makes its presence practically certain.

In the Red-breasted Nuthatch we have a species that is not recorded often enough to ascertain its approximate date of migration. The records obtained show great disparity, with 52 days between the extreme dates.

When the Tree Sparrows first arrives from the north, the birds are neither numerous nor in song, and consequently may be overlooked unless the observer is both experienced and diligent. My records for the species fall into two sets—two in November and two in October, but I think that the latter dates may be taken as the more exact, and so in the fourth week of October the careful observer will be sure to find a few Tree Sparrows.

My records for the Robin do not give conclusive evidence about the correct time of migration for the species. Two dates fall close together and two others are almost five weeks apart. This great irregularity is likely due to the habit which the Robin has of moving about a good deal in autumn in search of fruit—wild or cultivated—for food.

The writer has usually omitted from his comparison those species for which he has but a single date, hoping that future observations will furnish a sufficient number of records for a comparison.

	1909	1911	1912	1913
Cowbird	Aug. 18	Sept. 18	Oct. 11	Oct. 16
Red-winged Blackbird	Aug. 26		Nov. 1	Nov. 15
Hermit Thrush	Aug. 29-Oct. 22	Aug. 30-Oct. 21	Oct. 13	Aug. 30-Nov. 1
Kingbird	Sept. 2	Sept. 3	Aug. 22	Sept. 6
Orchard Oriole	Sept. 3			
Hummingbird	Sept. 4	Sept. 27	Aug. 14	Sept. 20
Vesper Sparrow	Sept. 4	Sept. 6	Sept. 30	
Baltimore Oriole	Sept. 4	Sept. 3	Sept. 5	Sept. 4
Barn Swallow	Sept. 6		Aug. 19	Aug. 31
Loggerhead Shrike	Sept. 6		Aug. 12	

	1909	1911	1912	1913
Purple Martin	Sept. 8	Aug. 23	Sept. 5	Aug. 25
Long-billed Marsh Wren	Sept. 8			Aug. 28
Least Flycatcher	Sept. 11	Aug. 22		Aug. 25-Sept. 26
Yellow Palm Warbler	Sept. 15-Oct. 15		Oct. 12	Sept. 27-Oct. 14
Bronzed Grackle	Sept. 15	Oct. 20	Nov. 8	Oct. 25
Warbling Vireo	Sept. 16	Sept. 27	Sept. 13	Sept. 15
Red-eyed Vireo	Sept. 17		Aug. 6	Sept. 3
Redstart	Sept. 20	Sept. 24	Sept. 20	Aug. 29-Sept. 28.
Maryland Yellowthroat	Sept. 21			Sept. 13
Cedarbird	Sept. 23	Sept. 10	Aug. 31	Sept. 11
Red-headed Woodpecker	Sept. 24	Sept. 1	Sept. 9	
Wood Pewee	Sept. 24	Sept. 10	Sept. 18	Sept. 28
Greater Yellowlegs	Sept. 24	Sept. 20	Oct. 25	Aug. 31
Brown Creeper	Sept. 25 arrival	Sept. 17 arrival		Sept. 13 arrival
Myrtle Warbler	Sept. 25-Oct. 1	Aug. 31-Oct. 29	Sept. 30-Oct. 27	Sept. 27-Nov. 6
Snowbird	Sept. 26 arrival	Sept. 17 arrival	Sept. 28 arrival	Sept' 4 arrival
Catbird	Sept. 26	Sept. 4	Sept. 18	Sept. 25
Indigo Bird	Sept. 26	Sept. 27	Sept. 22	Oct. 5
White-throated Sparrow	Sept. 28-Nov. 1	Sept. 27-Oct. 18	Sept. 26-Oct. 25	Sept. 15-Oct 27
Red-breasted Nuthtach	Sept. 30	Sept. 4	Oct. 26	Sept. 20
Black-billed Cuckoo	Sept. 30			Sept. 14
Chimney Swift	Oct. 4	Oct. 7	Sept. 29	Sept. 24
Yellow-billed Cuckoo	Oct. 7	Sept. 16	Sept. 25	Sept. 24
Yellow-bellied Sapsucker	Oct. 4-10	Sept. 5	Oct. 3	Sept. 19-Oct. 11
Phoebe	Oct. 10	Oct. 17	Sept. 25-Oct. 4	Oct. 13
Brown Thrasher	Oct. 12	Sept. 20	Sept. 13	Oct. 9
Nighthawk	Oct. 13			Sept. 8
Kingfisher	Oct. 13	Oct. 25	Oct. 27	Nov. 14
House Wren	Oct. 16	Sept. 21	Oct. 8	Oct. 14
Bluebird	Oct. 21	Nov. 1	Nov. 8	Oct. 31
Fox Sparrow	Oct. 23			
Meadowlark	Oct. 28	Oct. 23	Oct. 15	Nov. 5
Towhee	Oct. 28	Nov. 8	Oct. 24	Nov. 2
Chipping Sparrow	Oct. 29	Oct. 12	Sept. 4	Oct. 17
Hell Diver	Oct. 30	Oct. 28	Oct. 16	
Killdeer	Nov. 1	Oct. 14	Oct. 21	Oct. 31
Robin	Nov. 4	Nov. 21	Oct. 27	Nov. 5
Tree Sparrow	Nov. 9 arrival	Nov. 15 arrival	Oct. 25 arrival	Oct. 21 arrival
Goldfinch	Nov. 16	Nov. 24	Nov. 19	Dec. 14
Flicker	Nov. 18	Oct. 16	Oct. 15	Oct. 11
Cardinal	Nov. 20	Nov. 8	Nov. 13	
Northern Shrike	Nov. 29 arrival		Nov. 25 arrival	
Alder Flycatcher	Aug. 22			Aug. 14
Black and White Warbler	Aug. 22			Aug. 29-Sept. 27
Yellow-bellied Flycatcher	Aug 27			
Crested Flycathcer		Sept. 1	Sept. 13	Sept 12
Pine Warbler		Sept. 24	Sept. 14	Sept. 11-Oct. 26

	1909	1911	1912	1913
Black-throated Green Warbler		Sept. 29	Sept. 17	Aug. 30-Oct. 11
Spotted Sandpiper		Oct. 3	Aug. 5	
Chickadee		Oct. 9 arrival	Oct. 25 arrival	Oct. 6 arrival
Winter Wren		Oct. 14-Nov. 4		
Mourning Dove		Oct. 15	Sept. 23	
Field Sparrow		Oct. 29	Oct. 16	Oct. 27
Canada Geese		Nov. 1	Nov. 18	Oct. 20
Song Sparrow	Nov. 8	Nov. 15	Dec. 15	Dec. 7
Yellow Warbler			Aug. 6	Aug. 3
Wilson Wargler			Aug. 31	
Whip-poor-will			Sept. 20	

Pages 311-332 published August 4, 1914.

ERRATA.

Page 138, line 6. Scratch:—Rachis folii et petioluli dense albido-tomentori, marginaliter saltem.

Page 144, last line:—panes read paene.

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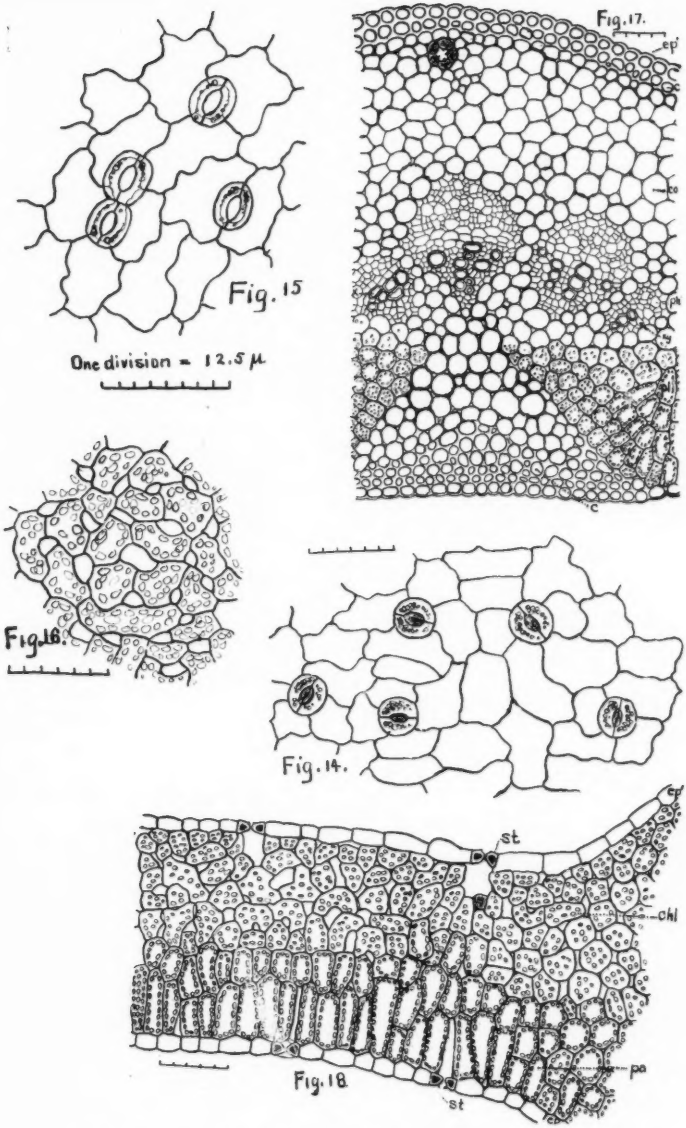

Plate XIII. HOECK on ANATOMY OF MEGALODONTA BECKII.